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CLAIMS

1. Gene expression system,  
**characterized in** that it comprises a gene/genes of interest that by genetic  
engineering have been operably linked to a strongly regulated promoter  
whose activity can be induced by an unmodified peptide, wherein said  
promoter and peptide are functional equivalent to promoters and peptides  
involved in the production of bacteriocins, except nisin, in lactic acid  
bacteria, and in that the products of two regulatory genes encoding a so  
called two-component regulatory system are essential for transducing the  
signal provided by said peptide into a change in activity of said strongly  
regulated promoter, and in that in naturally occurring lactic acid bacteria said  
regulatory genes are co-transcribed or closely associated with genes encoding  
said peptide, wherein the said peptide is a functional analogue of the peptide  
having the sequences shown in Seq. id. No. 1 and Seq. id. No. 2, and in that  
said gene/genes of interest are not identical to the genes that are operably  
linked to said promoter elements in the lactic acid bacterium from which said  
promoter elements are derived.
2. Gene expression system according to claim 1,  
**characterized in** that said peptide is capable of inducing its own production  
and/or the production of one or more bacteriocins in lactic acid bacteria.
3. Gene expression system according to claims 1-2,  
**characterized in** that said peptide is identical to the peptide having the  
sequences of Seq. id. No. 1 and Seq. id. No. 2.
4. Gene expression system according to claims 1-3,  
**characterized in** that said promoter is identical or functionally analogous to  
the promoter elements shown in Fig. 4.
5. A recombinant vector,  
**characterized in** that it comprises the gene/genes operably linked to the  
promoter elements according to claim 1-4, wherein this gene/these genes are  
not identical to the genes that are operably linked to said promoter elements  
in the lactic acid bacterium from which said promoter elements are derived.

6 A host cell,  
**characterized in** that it contains the gene/genes of claim 5 operably linked to  
the promoter, and in that the expression of the said gene/genes can be  
regulated by adding a peptide according to <sup>Claim 1</sup> ~~claims 1-4~~.

5 7. The host cells of claim 6,  
**characterized in** that some of the said genes and promoter elements are  
present in plasmids and some are present in the chromosome.

8. The host cells of <sup>Claim 2</sup> ~~claims 6-7~~,  
**characterized in** that the host is a Gram-positive bacterium, preferably a  
10 lactic acid bacterium.

9. The host cell of <sup>Claim 3</sup> ~~claims 6-8~~,  
**characterized in** that said host possesses the food consumption classification  
of GRAS (Generally Regarded As Safe).

10. The host cells of <sup>Claim 4</sup> ~~claims 6-9~~,  
**characterized in** that it is selected from the group consisting of members of  
15 the genera *Lactobacillus*, *Lactococcus*, *Pediococcus*, preferably members of  
the genus *Lactobacillus*, more preferably of *Lactobacillus sake* and  
*Lactobacillus plantarum*, most preferably of *Lactobacillus sake* LTH673 and  
*Lactobacillus plantarum* C11.

20 11. Peptide,  
**characterized in** that it has the amino acid sequence of Met-Ala-Gly-Asn-  
Ser-Ser-Asn-Phe-Ile-His-Lys-Ile-Lys-Gln-Ile-Phe-Thr-His-Arg (seq. id. no. 1).

25 12. Use the gene expression system according to claim 1 <sup>Claim 5</sup> ~~1-4~~, in any of the  
host cells described in ~~claims 6-10~~ to induce gene expression by adding any  
of the peptides described in claim 3.

13. Use of any of the host cells of <sup>Claim 6</sup> ~~claims 6-10~~ in fermentations.

14. Use of any of the host cells of <sup>Claim 6</sup> ~~claims 6-10~~ to produce a desired protein  
of interest.

15. A kit for using the expression system according to claim 1, in lactic acid bacteria, characterized in consisting of:

5 1) One or more recombinant vectors each vector containing a promotor element identical or similar to one of the promoter elements depicted in Fig. 4, directly followed by a multiple cloning site; these vectors may also contain one or more genes selected from the group K, R, IF, T, A (Fig. 1) or functional analogues of these genes,

10 2) Lactic acid bacteria that can function as host strain for these recombinant vectors, and that, depending on the recombinant vector used, may contain one or more genes selected from the group K, R, IF, T, A (Fig. 1) (or functional analogues of these genes) integrated in the chromosome, such that at least the genes K and R or functional analogues thereof are present in said lactic acid bacteria containing said recombinant vector.

15 3) A peptide that is capable of inducing the expression of genes under control of promoter elements similar or identical to the promoter elements depicted in Fig. 4 and that needs a two component system similar or identical to that encoded by genes K and R (Fig. 1) to exert its inducing action.



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